IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application		**Attorney Dkt No:**	L0008/US
of:	Muldermans et al.	**Confirmation No.:**	3187
Serial No.:	10/518,985	**Group Art Unit:**	1795
Filed:	December 21, 2004	**Examiner:**	Johnson, Connie P

Title: Photopolymerizable Compositions and Flexographic Printing Plates Derived Therefrom

Mail Stop Appeal Brief
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

APPEAL BRIEF

(37 CFR 41.37)

Honorable Sir:

This Appeal Brief is submitted in response to the Final Office Action issued September 30, 2008, and the Advisory Action issued January 26, 2009. Additionally, a Pre-Brief Appeal Conference decision was issued on March 4, 2009 to proceed to the Board of Appeals and Interferences.

The undersigned representative authorizes the Commissioner to charge any additional fees under 37 C.F.R. 1.16 or 1.17 that may be required, or credit any overpayment, to Deposit Account No. 14-1437, referencing Attorney Docket No.: 8132.003.PCUS00.

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REAL PARTY IN INTEREST

The real party in interest is Kraton Polymers U.S. LLC.

RELATED APPEALS AND INTERFERENCES

None

STATUS OF CLAIMS

As indicated in Appellant's Claims Appendix, Claims 11-14 and 17-30 are pending and claims 11-14 and 17-30 stand rejected.

STATUS OF AMENDMENTS

The claims have not been amended subsequent to the final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

The claimed subject matter of claim 1, including those claims depending therefrom, relate to a photopolymerizable composition which consists essentially of components (a) through (d).

Component (a) is one or more thermoplastic elastomeric block copolymers comprising the formula A-C-A (1) or $(A\text{-}C)_nX$ (2), wherein A represents a monovinyl aromatic hydrocarbon with an apparent molecular weight in the range of from 7,000 to 25,000, and wherein each C independently represents a substantially random copolymer block of predominantly isoprene and butadiene in a mutual weight ratio (Isoprene/Butadiene) in the range of from 20/80 to 80/20. *See Application, paras. 17, 18, 27-38.*

Component (b) is 1 to 60% by weight, based on the weight of components (a) and (b), of one or more photopolymerizable ethyenically unsaturated low molecular weight compounds. *See Application, paras. 39-42.*

Component (c) is from 0.1 to 10% by weight, based on the total photopolymerizable composition of one or more polymerization initiators. *See Application, paras. 43-44.*

Component (d) is from 0 to 40%, based by weight, based on the total photopolymerizable composition of one or more auxiliaries. *See Application, para.. 45.* The auxiliaries are selected from the group consisting of "plasticizers, aromatic resins, fillers, dyes and/or pigments, antioxidants, antiozonants, theal polymerization inhibitors, and liquid

poly(isoprene), liquid poly(butadiene) and/or liquid S-B or S-I diblock copolymers, and mixtures thereof.

The claimed subject matter of claim 24, including those claims depending therefrom, relate to a flexographic printing plates which consists essentially of components (a) through (d) as noted above.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 11-14 and 17-30 stand rejected under 35 USC §103(a) as being unpatentable over **Victor et al.** ("**Victor**"), US Patent No. 6,127,094.

ARGUMENT

Claims 11-14 and 17-30 stand rejected under 35 USC §103(a) as being unpatentable over **Victor et al.** ("**Victor**"), US Patent No. 6,127,094.

In the Final Office Action of September 30, 2009, the Examiner asserts that **Victor** discloses a photo polymerizable composition for use in flexographic printing plates. *Office Action, Sept. 30, 2009, p. 2.* In particular the Examiner argues that **Victor** teaches optional linear polymers for inclusion in the block copolymer component of the photopolymerizable composition. *Office Action, Sept. 30, 2009, p. 2.* The Examiner states that the composition may comprise up to 50wt% of a thermoplastic elastomeric block polymer having a formula A-B-A. The Examiner further asserts that although **Victor** teaches block copolymers in an amount of 10 to 50wt% in the composition, the reference does not specifically teach that the block copolymers are present in a 20/80 to 80/20 isoprene/butadiene ratio. *Office Action, Sept. 30, 2009, p. 3.* However, the Examiner concludes that it would have been obvious to one of ordinary skill in the art to use the isoprene and butadiene in a copolymer mixture of 20/80 to 80/20 because **Victor** teaches combining linear polymers, such as isoprene and butadiene to form water-resistant resin compositions after photopolymerization. *Office Action, Sept. 30, 2009, p. 3.*

Applicants note that **Victor** is directed to water developable photosensitive printing plates and compositions useful in preparation thereof. *Victor, col.1, lines 6-9*. **Victor** sought to produce printing plates which would have good properties, **yet allow for water processing**, where material could be carried away by an aqueous media. *Victor, col. 3, lines 8-39*. For example, a photosensitive printing plate could be exposed to electromagnetic radiation to promote polymerization of the printing plate in the form of a desired image, and then afterward, allow for the non-exposed portions to be removed by an aqueous media. *Victor, col. 12, lines 49-61*. The portions exposed to the radiation would not be removed as they would have been hardened by the radiation exposure, thereby leaving the desired image on the printing plate. Applicants note that the system of Victor must be very polar to be miscible in water.

The composition of **Victor** is disclosed in col. 3, line 43 to col. 4, line 13 of the reference:

(A) in the range of about 25 up to about 80 wt% of at least one copolymer consisting essentially of in the range of:

(i) about 25 up to about 95 mol % of at least one elastomer forming monomer,
(ii) about 0.5 up to about 30 mol % of at least one α,β-ethylenically saturated carboxylic acid, and
(iii) about 0.1 up to about 50 mol % of at least one polyfunctional vinyl monomer;
(further discussed in col. 4, line 36 to col. 5, line 7)

(B) 0.2 to 2 mol of a washout aid

(C) 5-70 wt% of at least one ethyleneically unsaturated monomer

(D) 0.01 to 20 wt% of at least one phopolymerization initiator

(E) 0-50 wt% of at least one polymer selected from:

(i) a linear thermoplastic, elastomeric block copolymer having the general formula (A-B-A), (A-B) or (A-B)

(ii) a linear polymer having a molecular weight of at least 1,000, which has at least 30 mol % of a conjugated diene unit;

(further discussed in col. 7, line 40 to col. 8, line 33)

(F) 0 to 20 wt% of at least one plasticizer;

(G) 0 to 20 wt% of at least one emulsifier.

Applicants note that component (A) which includes **elastomer forming monomers, namely acrylates, is required** for preparing the water processable printing plates of **Victor**.

As discussed in the present Application, the state of the art of printing relief forms did not always meet the requirements for flexographic printing. *See Application, pg. 2, paragraph [008].* For example, when S-I-S block copolymers are used, the obtained flexographic printing plates show a too low and hence unattractive Shore A hardness. *See Id.* Furthermore, when S-B-S block copolymers are used, the obtained flexographic printing plates show a bad processing stability leading to gel formation and resulting bad resolution of the final developed plate. *See Id.* When mixtures of the two are used, however, the transparency of the flexographic printing plate is poor.

In the present claimed invention, Applicants have demonstrated that with the present block copolymer, it is possible to have excellent transparency while at the same time maintaining a desirable balance of processing stability and plate hardness thereby providing a polymer which overcomes the deficiencies of the prior art.

Applicants note the present claims recite a photopolymerization composition, "consisting essentially of" components (a)-(d), where component (a) includes a block copolymer A-C-A or $(A\text{-}C)_nX$ (2). **Applicants respectfully submit that this transitional phrase is being ignored**. Instead of taking into account this transitional phrase, the Examiner instead makes an argument regarding isoprene and butadiene (**Victor**, col. 7, lines 51-65) as being components of a block copolymer in **Victor**, which even if was correct, Applicants submit the composition of **Victor** still falls outside of the present claims, namely because **Victor** requires inclusion of component (A) in **Victor** as discussed further below (**Victor**, col. 3, lines 46-53). *Office Action, Sept. 30, 2009, p. 3.*

As noted in MPEP §2111.03, this transitional phrase "limits the scope of a claim to the specified materials or steps 'and those that do not materially affect the basic and novel characteristics of the claimed invention.'" Therefore, if a composition of a cited reference includes a component which materially affects the basic and novel characteristics of a claimed invention, then the composition of the cited reference does not disclose or suggest that claim.

Applicants respectfully submit that even if **Victor** did disclose block copolymer A-C-A, the photosensitive resin composition of **Victor** requires additional components which would materially affect the basic and novel characteristics of the claimed invention. For example, the composition of **Victor** includes in part (A), Col. 3, lines 46-53:

> (A) in the range of about 25 up to about 80 wt% of at least one copolymer consisting essentially of in the range of:
> (i) about 25 up to about 95 mol % of at least one elastomer forming monomer,
> (ii) about 0.5 up to about 30 mol % of at least one α,β-ethylenically saturated carboxylic acid, and
> (iii) about 0.1 up to about 50 mol % of at least one polyfunctional vinyl monomer;

As the composition of **Victor** must include at the above, and its inclusion would materially affect the claimed invention, Applicants respectfully assert that for at least this reason **Victor** falls outside the scope of the present claims. This is true even if **Victor** discloses a block copolymer of A-C-A. The reference requires additional components thereby falling outside the scope of the present claims. This is true due to the inclusion of the transitional phrase "consisting essentially of" in claims 11 and 24.

The system of **Victor** is very polar, such that it will reach sufficient miscibility in water. This is because **Victor** is directed to water developable photosensitive printing plates and compositions useful in preparation thereof. *See* **Victor**, col. 1, lines 6-9. **Victor** sought to produce printing plates which would have good properties, yet allow for water processing, where material could be carried away by an aqueous media. *See* **Victor**, col. 3, lines 8-39. Accordingly, the additional components materially affect the basic and novel characteristics of the claimed invention. Therefore, the cited reference does not disclose or suggest the present claims.

The "Elastomer forming monomers" as in (A)(i) according to **Victor** are defined in Col. 4, lines 36-44 of the reference as :

> Elastomer forming monomers contemplated for use in the practice of the present invention include acrylates, methacrylates, and the like. Exemplary compounds contemplated for use herein include ethyl (meth)acrylate, methyl (meth)acrylate,

hydroxyethyl (meth)acrylate, dimethylaminopropyl (meth)acrylate, diethylaminopropyl (meth)acrylate, 2-ethylhexyl (meth)acrylate, butyl (meth)acrylate, lauryl (meth)acrylate, and the like, as well as mixtures of any two or more thereof.

Furthermore, "α,β-ethylenically saturated carboxylic acid" as in (A)(ii) according to **Victor** are defined in Col. 4, lines 45-50 as:

α,β-ethylenically unsaturated carboxylic acids contemplated for use in the practice of the present invention include methacrylic acid, acrylic acid, itaconic acid, maleic acid, β -carboxyethyl acrylate (.beta.-CEA), β-carboxyethyl methacrylate, and the like, as well as mixtures of any two or more thereof.

Additionally, "polyfunctional vinyl monomer" as in (A)(iii) according to **Victor** are defined in Col. 4, lines 51-59:

α,β-ethylenic site of unsaturation. Polyfunctional vinyl monomers contemplated for use in the practice of the present invention include ethyleneglycol di(meth)acrylate (i.e., ethyleneglycol diacrylate or ethyleneglycol dimethacrylate), divinyl benzene, 1,6-hexanediol di(meth)acrylate, 1,4-butanediol di(meth)acrylate, trimethylolpropane tri(meth)acrylate, erythritol tetra(meth)acrylate, and the like.

As seen above **Victor** requires additional components A(i)-(A)(iii) which fall outside the scope of the present claims, with components A(ii) and (A)(iii) by themselves causing **Victor** to fall outside of the claims. Therefore, for the above reasons, Applicants respectfully request the above mentioned rejection be withdrawn.

Moreover, with respect to the Examiner's argument, Applicants note that the liquid isoprene and butadiene mentioned by the Examiner (*Office Action, Sept. 30, 2009, p. 3,* **Victor**, col. 7, lines 51-65) are not encompassed by part (A) in **Victor**, but by component (E) in **Victor**. Additionally, Applicants assert that liquid isoprene and the butadiene polymers of **Victor**, col. 7, lines 51-65 are not the same as block copolymers having the formula A-C-A or $(A\text{-}C)_nX$. As indicated in **Victor**, these are linear polymers but not block copolymers. This can be seen by the fact that linear thermoplastic block polymers are discussed with respect to component (E) in **Victor**, Col. 3, lines 64 to Col. 4, line 5, and col. 7, line 65 to Col. 8, line 25, while linear polymers (such as liquid isoprene and butadiene) are discussed in Col. 4, lines 6-8 and Col. 7, lines 40-65 of the reference. Accordingly, liquid isoprene and butadiene are treated differently from block copolymers by **Victor.**

Additionally, in the advisory action of January 26, 2009, the Examiner further argues that liquid isoprene and liquid butadiene are recited in part (d) of Applicants claims 11 and 24. Applicants agree that claims 11 and 24 recite liquid poly(isoprene) and liquid poly(butadiene) in part (d) of each claim. The Examiner also states "In component (d) of the claimed invention, applicant discloses a block copolymer with the formula A-C-A." *Advisory Action, Jan. 26, 2009*. This is incorrect, Applicants recite this block copolymer structure in component (a) of claims 11 and 24. Liquid poly(isoprene) and liquid poly(butadiene) are not the same as block copolymers and should not be confused with block copolymers having the formula A-C-A.

Additionally, even though liquid poly(isoprene) and liquid(polybutadiene) are recited as auxiliaries in claims 11 and 24, this still does not change the fact that **Victor** requires additional components, namely the components in part (A) in **Victor** discussed above which cause **Victor's** composition to fall outside the instant claims.

The fact that part (d) of Applicants claims includes optional auxiliaries does not prevent Applicants from taking advantage of the transitional phrase "consisting essentially of." Applicants claimed invention may include these auxiliaries. However, inclusion of **Victor**'s component (A) in **Victor**'s composition is outside of the scope of parts (a) through (d) of the present claims as discussed above and their inclusion materially affects the basic and novel characteristics of the claimed invention. **Victor's** part (A) falls outside the scope of the present claims even including Applicants' claimed "auxiliaries." Accordingly, **Victor** does not disclose or suggest the claimed invention.

Applicants respectfully request the above mentioned rejection be withdrawn.

Furthermore, Applicants respectfully note that unexpected results may serve as a basis to show a claimed invention was not obvious. *MPEP §716.02*. Appellants note that the inclusion of the block copolymer (encompassed by component (E) in **Victor**) of **Victor** is entirely optional in the water processable printing plate composition. However as demonstrated in the present application, superior results are obtained by use of the claimed block copolymer, as claimed in component (a) of claims 11 and 24. The copolymer of the present invention provides a good balance of properties with regard to stability and hardness as evidenced by the data in Table 6 wherein the two S(I/B)S are clearly better in stability than the comparable SBS copolymers and in Table 7 where it is shown that the S(I/B)S1 had a hardness much higher than that of SIS alone.

Therefore, the mixed isoprene/butadiene midblock demonstrated a much better balance of stability and viscosity than the SBS copolymers and a much better hardness than the SIS copolymers. Additionally, the mixed midblocks according to the present claims demonstrated good transparency properties compared to blends of SIS and SBS copolymers which showed poor transparency. One of ordinary skill in the art would not expect such an improvement in the balance of properties from the disclosure of **Victor**, where block copolymers are optional. For this reason also then and Appellants respectfully request the above mentioned rejection be withdrawn. *See also, reply filed July 9, 2007, ps. 9-11.*

CLAIMS APPENDIX

The following is a correct listing of the current pending claims

11. A photopolymerizable composition, consisting essentially of:

(a) from 20 to 98.9% by weight, based on the weight of components (a) and (b), of one or more thermoplastic elastomeric block copolymers comprising a thermoplastic elastomeric block copolymer of the formula

A-C-A (1) or $(A\text{-}C)_nX$ (2)

wherein each A independently represents a polymer block of predominantly a monovinyl aromatic hydrocarbon having an apparent molecular weight in the range of from 7,000 to 25,000, wherein n is an integer equal to or greater than 2 and wherein X is the residue of a coupling agent, and wherein each C independently represents a substantially random copolymer block (I/B) of predominantly isoprene and butadiene in a mutual weight ratio in the range of from 20/80 to 80/20, wherein said polymer block C has a glass transition temperature (Tg) of at most 0°C, (determined according to ASTM E-1356-98), and having a vinyl bond content (the 1,2 and/or 3,4 addition polymerization of the isoprene and butadiene) in the range of from 5 to 70 mole%, said thermoplastic block copolymer having a poly(monovinyl aromatic hydrocarbon) content in the range of from 10 to 45 wt% and having an apparent molecular weight of the complete block copolymer in the range of from 100,000 to 1,500,000,

(b) from 1 to 60 % by weight, based on the weight of components (a) and (b), of one or more photopolymerizable ethylenically unsaturated low molecular weight compounds,

(c) from 0.1 to 10 % by weight, based on the total photomerizable composition of one or more polymerization initiators, and optionally

(d) from 0 to 40 % by weight, based on the total photopolymerizable compositions, of one or more auxiliaries, wherein the auxiliaries are selected from a group consisting of plasticizers, aromatic resin, fillers, dyes and/or pigments, antioxidants, antiozonants, thermal polymerization inhibitors and liquid poly(isoprene), liquid poly(butadiene) and/or liquid S-B or S-I diblock copolymers, and mixtures thereof.

12. The photopolymerizable composition of claim 11, wherein the thermoplastic elastomeric block copolymer of the formula

A-C-A (1) or $(A\text{-}C)_nX$ (2)

comprises at least 30% by weight of said component (a).

13. The photopolymerizable composition of claim 11, wherein the weight proportions of component (a) are in the range of from 20 to 80 % by weight.

14. The photopolymerizable composition of claim 12, wherein the weight proportions of component (a) are in the range of from 20 to 80 wt%

17. The photopolymerizable composition of claim 11, wherein component (b) is selected from esters or amides of acrylic acid or methacrylic acid with monofunctional or polyfunctional alchols, amines, aminoalcohols and hydroxyl ethers or hydroxyl esters.

18. The photopolymerizable composition of claim 17, wherein component (b) is selected from butyl acrylate, isodecyl acrylate, trimethylolpropane triarcylate and dipentaerythritol monohydroxypentacrylate.

19. The photopolymerizable composition of claim 11, wherein component (b) is selected from esters or amides of acrylic acid or methacrylic acid with monofunctional or polyfunctional alcohols, amines, aminoalcohols and hydroxyl ethers or hydroxyl esters.

20. The photopolymerizable composition of claim 11, wherein the weight proportions of component (b) are in the range of from 5 to 30% by weight, relative to the weight of components (a) and (b).

21. (Previously presented) The photopolymerizable composition of claim 19, wherein the weight proportions of component (b) are in the range of from 5 to 30% by weight, relative to the weight of components (a) and (b).

22. The photopolymerizable composition of claim 11, wherein the weight proportions of component (c) are in the range of from 0.5 to 5% by weight, relative to the weight of the total copolymerizable composition.

23. The photopolymerizable composition of claim 21, wherein the weight proportions of component (c) are in the range of from 0.5 to 5% by weight, relative to the weight of the total copolymerizable composition.

24. A flexographic printing plate derived from a photopolymerizable composition, said flexographic printing plate comprising a support layer, an optional adhesive layer and/or antihalation layer, one or more photopolymerizable layers, an optional elastomeric intermediate layer and a cover layer, said one or more photopolymerizable layers consisting essentially of:

(a) from 20 to 98.9% by weight, based on the weight of components (a) and (b), of one or more thermoplastic elastomeric block copolymers comprising a thermoplastic elastomeric block copolymer of the formula

A-C-A (1) or $(A\text{-}C)_nX$ (2)

wherein each A independently represents a polymer block of predominantly a monovinyl aaromatic hydrocarbon having an apparent molecular weight in the range of from 7,000 to 25,000, wherein n is an integer equal to or greater than 2 and wherein X is the residue of a

coupling agent, and wherein each C independently represents a substantially random copolymer block (I/B) of predominantly isoprene and butadiene in a mutual weight ratio in the range of from 20/80 to 80/20, wherein said polymer block C has a glass transition temperature (Tg) of at most 0°C, (determined according to ASTM E-1356-98), and having a vinyl bond content (the 1,2 and/or 3,4 addition polymerization of the isoprene and butadiene) in the range of from 5 to 70 mole% said thermoplastic block copolymer having a poly(monovinyl aromatic hydrocarbon) content in the range of from 10 to 45 wt% and having an apparent molecular weight of the complete block copolymer in the range of from 100,000 to 1,500,000,

(b) from 1 to 60 % by weight, based on the weight of components (a) and (b), of one or more photopolymerizable ethylenically unsaturated low molecular weight compounds,

(c) from 0.1 to 10% by weight, based on the total photomerizable composition of one or more polymerization initiators, and optionally

(d) from 0 to 40% by weight, based on the total photopolymerizable compositions, of one or more auxiliaries, wherein the auxiliaries are selected from a group consisting of plasticizers, aromatic resin, fillers, dyes and/or pigments, antioxidants, antiozonants, thermal polymerization inhibitors and liquid poly(isoprene), liquid poly(butadiene) and/or liquid S-B or S-I diblock copolymers, and mixtures thereof.

25. The flexographic printing plate of claim 24, wherein the support layer comprises sheets of various film-forming synthetic polymers selected from polyster and polyester/polyamide sheets.

26. The flexographic printing plate of claim 25, wherein the sheets are polyethylene terephtalate sheets.

27. A flexographic printing relief form, prepared from the flexographic printing plate of claim 24.

28. The photopolymerizable composition of claim 11, wherein the block copolymer is mixed with either polystyrene-polyisoprene-polystyrene (SIS) and/or polystyrene-polybutadiene-polystyrene (SBS) type block copolymers.

29. The photopolymerizable composition of claim 11, wherein the mutual weight ratio between isoprene and butadiene in the I/B blocks is in the range according to the equation:

$-30<40+V-I<30$

wherein I is the isoprene content in the I/B block and "V" is the molar ratio in percent of 1,2 or 3,4 addition polymerization in the I/B blocks.

30. The photopolymerizable composition of claim 24, wherein the mutual weight ratio between isoprene and butadiene in the I/B blocks is in the range according to the equation:

$-30<40+V-I<30$

wherein I is the isoprene content in the I/B block and "V" is the molar ratio in percent of 1,2 or 3,4 addition polymerization in the I/B blocks.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None